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## ON THE SPECIFIC VALIDITY OF *CAMPELOMA MILESII* LEA.

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There has been considerable difference of opinion expressed, both in regard to the specific validity of this form and in regard to its relations to the other recognized species of the genus.

The types were collected by the late Manly Miles, formerly State Geologist of Michigan, in Branch Lake, Antrim county, in the extreme northwestern part of the State, and were described by Dr. Lea, in 1863.<sup>1</sup> Binney, in 1865,<sup>2</sup> included it in the aggregation which he assembled around *Campeloma decisa*. Dr. James Lewis, in his review of Binney's work in the Am. Jour. of Conchology,<sup>3</sup> declared that it "has claims to the rank of a species that must be recognized." And later, in the same Journal,<sup>4</sup> associated it with *decisa* in the group characterized by "shells of thin texture, whorls usually regularly rounded, suture well impressed, spire regular in proportion and, when perfect, acute."

Tryon, in his continuation of Haldeman,<sup>5</sup> concludes that "it does not exceed the usual variation of *decisa*," and does not allow it even varietal rank. Call, in his elaborate paper "On the Genus *Campe-loma*,"<sup>6</sup> refers it to *C. subsolida* Anth. And in this he is followed

<sup>1</sup> Proc. Phil. Acad. Nat. Sci., 1863, p. 156.

<sup>2</sup> L. & F. W. Shells, Pt. III, p. 42 (1865).

<sup>3</sup> A. J. of C., IV, p. 60 (1868).

<sup>4</sup> A. J. of C., V, p. 33 (1869).

<sup>5</sup> Mon. F. W. Univalve Moll., p. 28 (1870).

<sup>6</sup> Bull. Wash. Coll. Lab. N. H. I., p. 155 (1886).

by Baker,<sup>1</sup> in his recent work on the "Mollusca of the Chicago Area." Lea's figure,<sup>2</sup> which is copied by Tryon, is either very poor or else represents an abnormal specimen. Binney's figure, which is stated to be from one of the types, is more accurate and represents the species as usually found at the present time.

*Campeloma milesii* has not as yet been recorded from outside the state of Michigan. In that State it has a well-defined and somewhat peculiar distribution and, wherever found, seems to preserve its essential characteristics as fully as any of the other recognized species of the genus (figs. 1, 2, 3, 4, 7, 8 and 9). It is an interesting coincidence, if nothing more, that its range is substantially the same as that of *Limnæa catascopium* and *Physa ancillaria magnalacustris*, which are the characteristic univalves of the shores of the Great Lakes and of the rivers and lakes in close proximity to them. The localities thus far recorded for *milesii* are the Detroit River, Saginaw Bay, Carp Lake and Crooked Lake Emmet county, Branch Lake Antrim county, North Lake on Beaver Island in Lake Michigan and the Pine River Marquette county. In most of these localities it is associated with *C. decisa* and in some with *C. rufa*. On the other hand, the range of *C. subsolida* in Michigan is quite different. This species on the eastern side of the State has not been found north of the Clinton River. On the western side it is abundant in the St. Joseph and Grand Rivers and apparently ranges as far north as Charlevoix, which is the only place where it has been found associated with *milesii*. Neither form has been reported from the interior of the State, and *subsolida* does not seem to be found in waters of any of the Great Lakes. From this, it is evident that the ranges of the two forms are quite different and only impinge in the extreme northwestern part of the lower peninsula.

Compared with *C. subsolida*, as found in the southern part of the State (fig. 11), and which is quite typical, it differs both in form and texture. *Subsolida* is a large, thick, heavy shell, with a blunt apex, sinuous lip and with a heavy white deposit on the parietal wall. It is practically free from erosion. On the other hand, *milesii* has a thin shell, a regularly-tapering, acute spire, a thin, transparent parietal callus, a much less sinuous lip, and is usually only about half the

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<sup>1</sup> Moll. of Chi. Area, p. 361 (1902).

<sup>2</sup> Observations, XI, pl. 24, fig. 114.

size. It is extremely subject to erosion, and mature specimens with a perfect apex are comparatively rare. If, as has been stated, *milesii*, like *exilis*, is a sexual variation of *subsolida*, it is remarkable that it has not been found associated with that species in localities where that species is abundant, and it is still more remarkable that where it is found, its slender form is persistent and equally characteristic of both sexes. The only form of *subsolida* with which *milesii* can at all be compared, is the slender form from the Mississippi Valley known as *C. exilis* Anth. (fig. 10). Just what the relations of this form with the typical *subsolida* are, have never been satisfactorily explained. If, as generally considered, it is merely a sexual variation, it is a curious fact that it has never been found in any of the Michigan rivers where the typical form is abundant. But however that may be, while superficially resembling *milesii* in its slender elongated form, it differs, like the typical *subsolida*, in the shape of the spire, the less rounded whorls, and consequently less impressed suture, shape of the lip and texture. It seems clear, therefore, that *milesii* cannot be referred to *subsolida* even as a varietal form.

There yet remains to be considered its relation to the congeneric forms, with which it is frequently found associated. The characteristic color and texture of *C. rufa* are always sufficient to distinguish it, even when the erosion of the upper whorls has destroyed the outline of the more elongated *milesii*.

Lewis was quite right when he grouped *decisa* and *milesii* together, and it must be confessed that the exact relation of the two forms is not free from doubt. *Milesii* is more closely related to *decisa* than to any other species, and it is possible that when a greater abundance of material can be had, it may be relegated to varietal rank. But from our present knowledge, the forms seem quite as distinct as any of the more closely-related species of *Campeloma*, which are recognized, and it would seem better to keep them separate until their specific identity can be unquestionably established. Compared with *decisa* as it is commonly found, *milesii* is a thinner, more elongated shell, with a more acute apex; the upper whorls are more convex and the suture rather more deeply impressed; the aperture is smaller and narrower. This difference is well shown in the two forms as found together in the Pine River, Marquette county (figs. 9 and 12).

Then, too, there is a marked difference in the shape of the young when ready for extrusion. It will be remembered that Dr. Lewis

laid great stress on such differences in his study of this group, relying on the well-recognized principal that "marked differences in the embryos and young of a class of beings are specific." The young *milesii* when ready for extrusion is uniformly larger than the young of *decisa* (*milesii* 4.75 x 3.50, *decisa* 4.25 x 3.50 mill., specimens figured). The shell is more slender and noticeably more elongated, the apex being well elevated above the next whorl, while in *decisa* the apex is depressed, giving a planorboid shape to the apex, and rises scarcely if at all above the second whorl. This difference, shown by figs. 5 and 6 from the two species as found together in the Detroit River, is characteristic and persistent. There is no substantial variation in the young of the Detroit River *milesii*, and none in fourteen different lots of *decisa*, from localities as widely separated as Port Cram, N. J., Detroit River, Grand Rapids and Marquette county, Michigan. The color in both forms is the same, a pale green, and both have raised revolving lines of epidermal tissue.

It is unfortunate that no detailed anatomical examination of either species has ever been published. It is quite possible that when that is done, other differences will be found which will confirm the view herein expressed. In the meantime, it certainly seems advisable to recognize the specific validity of this interesting form.

#### EXPLANATION OF PLATE V.

1. *Campeloma milesii* Lea. Detroit River, Michigan.
2. *Campeloma milesii* Lea. Detroit River, Michigan.
3. *Campeloma milesii* Lea. Detroit River, Michigan.
4. *Campeloma milesii* Lea. Saginaw Bay, Michigan.
5. *Campeloma milesii* Lea. (Young.) Detroit River, Michigan.
6. *Campeloma decisa* Say. (Young.) Detroit River, Michigan.
7. *Campeloma milesii* Lea. Charlevoix, Michigan.
8. *Campeloma milesii* Lea. Carp L., Emmett Co., Michigan.
9. *Campeloma milesii* Lea. Pine River, Marquette Co., Mich.
10. *Campeloma exilis* Anth. Illinois River, Illinois.
11. *Campeloma subsolida* Anth. Clinton River, Macomb Co., Mich.
12. *Campeloma decisa* Say. Pine River, Marquette Co., Mich.